MOSES PRASAD VARGHESE

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EDUCATION

Master of Science in Mechanical Engineering (Data Science) | University of Washington Seattle, WA | June 2023

- Relevant coursework: Software Development for Data Scientists, Data Science and Materials Informatics, Natural Language Processing, Database Management Systems, Reinforcement Learning, Deep Learning, Computer Vision, Applied Parallel Computing, Control Systems
- GPA: 3.85/4.00

Bachelor of Technology in Mechanical Engineering | National Institute of Technology Rourkela, India | June 2018

- Relevant coursework: Data Structures and Algorithms, C and C++ programming, Advanced Mechatronics, Computer Graphics for CAD/CAM, Basic Electronics and Electrical Engineering, Electrical Machines
- CGPA: 8.33/10.00

WORK EXPERIENCE

Data Scientist | Stealth Startup, Seattle, WA | October 2023 – November 2023

- Coordinated in web scrapping for data collection and understanding data storage for better search results
- Developed a search and recommendation feature for web-application to improve search personalization
- Initiated to develop metrics for recommendation system with decision-support and ranking-based metrics
- Conducted code refactoring, documentation and use of NLP and ML algorithms study for scalability

Machine Learning Intern | Chubb Insurance, Jersey City, New Jersey (remote) | September 2022 - March 2023

- Completed data extraction on unstructured documents for classification with Azure form recognizer API
- Implemented data postprocessing algorithm with regular expressions after information extraction
- Trained data on customized AI models with Azure Doc AI for entity detection with 80% accuracy
- Designed automated data capture tool by Azure entity extraction via FastAPI, Docker, Kubernetes, CI/CD test
- Developed a ML anomaly detection algorithm for fraud claims by probabilistic unsupervised learning

Student Technician III – IT Developer | University of Washington Seattle, WA | August 2022 - September 2022

- Developed efficient documentation scheme for the codebase in C# and .NET
- Researched on code refactoring to improve code readability, maintainability and performance

PROJECTS

Machine Learning with Material Science Project | University of Washington Seattle, WA | Jan 2023 – Mar 2023

- Completed a course project and contributed to open-source python library solcore to model, analyze and visualize solar cells and semiconductor materials data

Database Application Development Project | University of Washington Seattle, WA | June 2022 - August 2022

- Accomplished study on query languages (SQL, datalog), data models (relational, semi-structured), language bindings, conceptual modeling, security, database tuning and indexing, data warehousing, parallelism (MapReduce, Spark), web-data management, schema design, logical and physical design, SQL Server on Windows Azure, transactions, cloud database systems, SQLite, AsterixDB
- Developed and designed a database application with functionalities to create and manage user records, login and logout, for scheduling and inventory management using SQL from within Python library pymssql that run on command line terminal with database server connected via Azure

Database Development Project | Institute for Health Metrics and Evaluation, Seattle, WA | June 2022 - August 2022

- Supervised a team for the project on database design and management
- Developed an Entity Relationship Diagram (ERD) with the existing database and SQL files for better efficiency
- Investigated issues in the architecture based on ERD for faster performance to read/write to the database

Deep Learning Project | University of Washington Seattle, WA | April 2022 - June 2022

- Accomplished study on approximation, optimization and generalization theory, deep reinforcement learning, neural network architecture, transformer, encoder-decoder, representation and unsupervised learning
- Conducted a research article study on Long-Term Visual Dynamics with Region Proposal Interaction Networks
- Analyzed the representation learning for images and physical reasoning by Convolution Interaction Networks

Computer Vision Project | University of Washington Seattle, WA | April 2022 - June 2022

- Accomplished study on image coordinates and transforms, resizing, filters and convolutions, interest operators, image matching and stitching, face/object detection, CNN applications, motion/optical flow
- Conducted a research article study on Global Association Network for Lane Detection with ResNet architecture
- Developed a ResNeXt model as the backbone replacing ResNet with self-attention and achieved 94% F1 score

Applied Parallel Computing Project | University of Washington Seattle, WA | April 2022 - June 2022

- Accomplished study on GPU utilization, CUDA and numba libraries in python and memory allocation
- Developed an algorithm to determine the Stereoscopic Depth Perception with 3 billion pixel calculations
- Implemented parallelization using global memory, 2D grid and 32 threads per block for faster computation
- Achieved an accuracy of 85% with 147x times faster computation compared to sequential algorithm

Natural Language Processing Project | University of Washington Seattle, WA | January 2022 - March 2022

- Accomplished study on language modeling, vector embeddings, morphology & WFST's, sequence labeling & conditional random fields, syntax, semantics, linguistic structure prediction, translation & sequence-to-sequence models
- Conducted a research article study on aspect-based sentiment analysis (ABSA) using supervised contrastive learning (SCAPT), transformer encoder and BERT
- Analyzed the results of the model and validated it with a new dataset achieving 86% accuracy

Software Development for Data Scientist Project | University of Washington Seattle, WA | Sept 2021 - Dec 2021

- Developed real-time user-interface web application dashboard with streamlit framework in python to display stock price metrics with a trading algorithm based on sentiment analysis
- Collected an average of 1.6 million data points by gathering information from media posts related to a specific stock ticker and its corresponding stock price data
- Designed and implemented a sentiment analysis algorithm using the VADER module, which generated social media specific sentiments for the stock and converted them to a trading indicator
- Applied deep reinforcement learning to factor the trading signal and the company's stock price to make buy/sell decisions in a simulated trading environment for one year
- Achieved an overall accuracy of above 70% on model decision with the expected result

Data Science and Materials Informatics Project | University of Washington Seattle, WA | Sept 2021 - Dec 2021

- Conducted a research article study on heterogeneous deformation in grain boundary regions on shock loaded tantalum element with nanoindentation
- Implemented machine learning-based analysis to compare with the experimental data
- Trained the data on linear and multilinear regression for the element characteristic predictions and used elbow and silhouette methods to predict optimal clusters on different nanoindentation methods
- Achieved 82% accuracy on regression and 80% on classification
- Applied ANN, CNN for image classification, KNN classification, decision trees, PCA, SOM, SVM and K-means clustering for large datasets of material properties to analyze and evaluate material features
- Developed ML models with visualization in seaborn, plotly, altair, bokeh, pygal, gleam, plotnine, matplotlib

Machine Learning Certification | Stanford University (Coursera) | May 2020 – August 2020

- Developed a robust method of automated handwritten digit recognition with neural network learning
- Developed an SVM spam classifier with a training accuracy of 99.8% and a test accuracy of 98.5%
- Developed an image compression algorithm by K-means clustering
- Developed a PCA system for low-dimensional representation of 5000 image dataset
- Developed an anomaly detection system to detect failing servers on a network
- Developed a collaborative filtering learning algorithm to build a recommender system for movies

Robotics Specialization Certification | University of Pennsylvania (Coursera) | May 2020 – August 2020

- Developed a simple augmented reality application using KLT, homograph and perspective projection
- Developed a Kalman filter model for ball tracking in 2D space
- Developed a bundle adjustment algorithm to extract key elements of structure from motion
- Developed a particle filter algorithm for pose tracking in 2D space for robot localization from LIDAR
- Developed an Occupancy Grid Mapping tool with Log-odd update for a 2D map with sensor readings and poses
- Developed a simulation of Gaussian model for learning ball color and detection based on the color model
- Developed a two-link and six-link robot arm simulation to navigate through complex configuration space based on probabilistic road maps and artificial potential fields
- Designed and developed a simulation of 1D, 2D and 3D PD controller with trajectory generation

PUBLICATION

Anwesa Mohanty, **Moses Prasad Varghese**, Rabindra Kumar Behera, "Coupled nonlinear behavior of beam with a moving mass", Applied Acoustics, Volume 156, 2019, pp. 367–377

PROFESSIONAL MEMEBERSHIP

Member | International Association of Engineers (IAENG) | August 2020 - Present

ADDITIONAL EXPERIENCE

Database and Student Programs Assistant | FIUTS, Seattle, WA | August 2023 – August 2024

- Analyzed to automate read/write to Salesforce database with Process Builder, Flows and Integration features
- Facilitated with student programs to setup, manage student data and lead activities
- Initiated to improve data warehouse performance by indexing and removing redundant and duplicate data

Code-To-Give Hackathon | Morgan Stanley, Alpharetta, Georgia (remote)| March 2022 - April 2022

- Designed a web application with HTML, CSS, JavaScript and Python with Bootstrap and Django framework
- Developed features for the application to schedule an appointment and setup a profile

Student Researcher | National Institute of Technology Rourkela, India | January 2017 - December 2019

- Analyzed the coupled nonlinear dynamics of beam with moving mass to evaluate the modal behavior of system
- Designed fundamental geometric model with nonlinearities of the dynamic structure with energy conversion
- Applied Hamilton's principle, Galerkin Discretization and Method of Multiple Scales for analytical framework
- Developed MATLAB ODE solver algorithm for numerical analysis and simulation
- Achieved a confidence of greater than 90% between analytical, numerical and simulation results
- Published research article in the Journal of Applied Acoustics

Professional in Product Design and Analysis | CADD Centre Training Services, Thrissur, India | December 2016

- Accomplished study on the software design and working of AutoCAD, CATIA, ANSYS
- Achieved 2nd position for the best design projects in AutoCAD and ANSYS

SKILLS

- Programming: Python, C/C++, SQL/NoSQL, MATLAB, R, C#, HTML, CSS
- Tools: Linux, Git, Docker, Kubernetes, Tableau, PySpark, Databricks, Jira, Jenkins, SonarQube, Azure, JSON, Visual Studio, Apache Spark, JupyterNotebook
- Frameworks: PyTorch, TensorFlow, FastAPI, NLTK, LangChain, Vertex AI, OpenCV, Keras, Scikit-learn, Streamlit, NumPy, Pandas, Seaborn, Matplotlib, CUDA, Numba, Open Source